

SE MRC College Algebra Content Review

Exponential Growth and Decay; Modeling Data Section 4.5

Learning Objectives:

1. Model exponential growth and decay.
2. Use logistic growth models.
3. Choose an appropriate model for data.
4. Express an exponential model in base e .

3. The exponential model $A = 55.7e^{0.014t}$ describes the population, A , of a country in millions, t years after 2003. Use the model to determine when the population of the country will be 60 million.

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1. The exponential model $A = 363.1e^{0.018t}$ describes the population, A , of a country in millions, t years after 2003. Use the model to determine the population of the country in 2003.

The population of the country in 2003 was _____ million.

2. The exponential models describe the population of the indicated country, A , in millions, t years after 2006. Which country has the greatest growth rate? By what percentage is the population of that country increasing each year?

Country 1: $A = 146.9e^{-0.006t}$

Country 2: $A = 125.8e^{0.002t}$

Country 3: $A = 28.1e^{0.025t}$

Country 4: $A = 1089.9e^{0.013t}$

Country _____ has the greatest growth rate.

The population of that country is increasing by _____% each year.

The population of that country will be 60 million in _____.

4. An artifact originally had 16 grams of carbon-14 present. The decay model $A = 16e^{-0.000121t}$ describes the amount of carbon-14 present after t years. Use the model to determine how many grams of carbon-14 will be present in 7316 years.

The amount of carbon-14 present in 7316 years will be approximately _____ grams. (Round to the nearest whole number.)

5. Prehistoric cave paintings were discovered in a cave in France. The paint contained 2% of the original carbon-14. Use the exponential decay model for carbon-14, $A = A_0e^{-0.000121t}$, to estimate the age of the paintings.

The paintings are approximately _____ years old.

6. The half-life of a certain tranquilizer in the bloodstream is 40 hours. How long will it take for the drug to decay to 82% of the original dosage? Use the exponential decay model, $A = A_0e^{kt}$, to solve.

____ hours.

Answer Key:

1.	363.1	
2.	3	2.5
3.	2008	
4.	7	
5.	32,331	
6.	11.5	